

ABSTRACT

**DISTURBANCE ATTENUATION IN A PRECISION SERVOMECHANISM
BY A FREQUENCY-SEPARATED ACCELERATION SOFT SENSOR**

In servomechanisms, disturbances, for example, friction, shock and vibration, prevent
5 the system positioning accuracy from further improvement. These disturbances occur in a
relatively low-frequency range compared to the electrical dynamics. In the present
invention, an acceleration feedback control loop using a frequency-separated acceleration
soft sensor replaces the conventionally used current control loop in the low frequency
range, where the disturbances occur, so as to attenuate the influence of the disturbances
10 enclosed in the loop. The current feedback continues to manage the electrical dynamics in
the high-frequency range. Estimating the required acceleration signal by a soft sensor
eliminates the need for physical accelerometers, which reduce system reliability and
increase system cost. The acceleration feedback control loop constructed with the obtained
acceleration signal also makes the system more robust to the parameter inaccuracies and
15 variations within the loop. This invention can be easily implemented with either software
or hardware.

Fig.3 is to be published.